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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : B01D 46/44	A1	(11) International Publication Number: WO 99/21638
		(43) International Publication Date: 6 May 1999 (06.05.99)

(21) International Application Number: PCT/SE98/01923

(22) International Filing Date: 23 October 1998 (23.10.98)

(30) Priority Data:
9703936-6 28 October 1997 (28.10.97) SE

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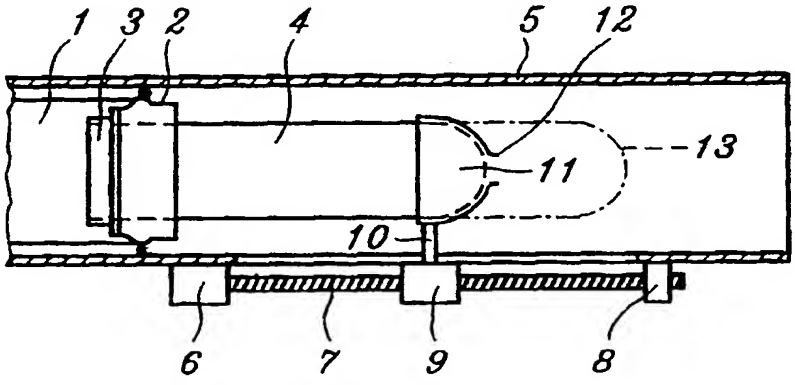
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.
In English translation (filed in Swedish).

(54) Title: DEVICE IN VENTILATION DUCTS PROVIDED WITH ADJUSTABLE FILTER MEANS



(57) Abstract

The invention relates to an arrangement of ventilation plants comprising ducts in which bag filters or similar bag-shaped filters (4) made of filter gauze are mounted. For individual adjustment of the air throughflow capacity of the filters the effective length of the filters is adjusted which, according to the invention, is carried out by means of an actuating means (23) which is axially pressed against the end portion of the filter (4) directly or by use of a casing of net material enclosing the filter, which casing has two ends axially fixed and is pursed up by a ring-shaped member of the actuating means (23).

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DEVICE IN VENTILATION DUCTS PROVIDED WITH ADJUSTABLE FILTER MEANS

The present invention relates to an arrangement of ventilation ducts of the type set forth in the preamble of the following claim 1.

Arrangements of this type are known from the Swedish patent 9504324-6. These arrangements comprise filters that are made such, that the air flows through the ducts can be adjusted in correspondence to the ventilation need. The technique results in lower energy costs for the treatment of the supplied air flow by reducing the flow to the actual need. By using the filters for adjusting the air flows a ventilation system has been created that also is characterized by clean ducts without complicating and noise generating filter boxes, mechanical throttling devices and similar means. The characteristic of working noiseless of tested plants has excited a well-founded attention. It is a condition, however, that the adjustment of the filters can be carried out in a simple and exact manner, and that the adjustment means have a long life.

The object of the invention is to achieve an arrangement of the kind set forth by way of introduction that fulfils the above mentioned demands.

This object is achieved in accordance with the invention by an arrangement having the characterizing features set forth in claim 1. Further improvements of the invention are characterized as set forth in claims 2-10. It has turned out that such a simple device as an actuating means movable to and fro that is applied against the end portion of the filter and is pressing together the filter a bit gives rise to a very exact adjustment of the air throughflow capacity of the filter. The actuating means may be tapered or hemispheric according to claim 2, and may preferably be provided with a central aperture securing the end portion of the filter safely in the actuating means.

The arrangement has, according to a preferred embodiment, the design set forth in claim 4. The ring-shaped actuating means presses by means of the casing the filter end portion axially and radially in a very careful way without letting the actuating means slide only against the outside of the filter but more through the casing, which can consist of a material that is more durable and exerts less friction forces in contact with the actuating means than with the filter.

The invention will now be described in more detail with reference to two exemplifying embodiments thereof and with reference to the accompanying schematic drawings in which Figure 1 is a side view, partly in section,

of a first embodiment, and Figure 2 is a side view, partly in section, of a second embodiment.

Figure 1 shows an intake air duct 1 with an opening 2 in which a fastener 3 of a bag-like filter 4 is easily detachably attached. A hood 5 is attached around the filter 4. At the outside of the hood 4 a threaded rod 7 is rotatably journalled in the motor and in a bearing 8. A guide means with a threded sleeve 9 is movably journalled on the rod 7 and provided with the same thread as the thread of the rod 7. The sleeve 9 is provided with an arm 10 extending through a sealed slit in the hood 5 and supporting a substantially conical actuating means 11 having a pointed end portion in which an aperture 12 is formed.

When completely folded out by the ventilation air flow the filter 4 has the shape indicated by the dot-dashed lines 13, and the actuating means 11 is positioned in an outer end position in contact with the end portion of the filter 4. Throttling of the air throughflow capacity is achieved by turning the rod 7 by the motor 6 such, that the sleeve 9 is moved to the left on the drawing bringing with itself the arm 10 and the actuating means 11. This means that the actuating means 11 is pressed against the end portion of the filter 4, which end portion is folded together to the shape shown on the drawing. By that the air throughflow capacity is reduced by a defined value. The opening 12 in the point of the actuating means 11 promotes to a safe fixation of the end portion of the filter against the inside of actuating means, which in addition to that may be perforated all over its surface.

As an alternative, the actuating means 11 may have the shape of a clamping device for securing the closed end of the filter to the actuating means, in which case the arm 10 suitably may be rotated for winding on or unwinding the filter during the movements of the arm 10.

An example of a preferred development of the embodiment shown in Fig.1 is shown and described in the following with reference to Fig.2, where the same reference numerals are used for similar details as in Fig.1. In the embodiment according to Fig.2 the filter 4 is provided with a casing 20 made of air pervious material, for example a plastic net, or a number of parallel strings or ribbons of plastic material, or other suitable material having a surface as slippery as possible. One end of the casing is attached to the fastener 3 of the filter and its other end is attached to a fixedly mounted clamping device 21 secured to an arm 22 extending through an opening in the wall of the hood 5. The tapered actuating means 11 in Fig.1 is in

the embodiment in Fig.2 replaced by a ring-shaped actuating means 23 enclosing a constricted part of the casing 20.

The embodiment shown in Fig.2 is operated in the following manner. At the displacement of the actuating means 23 to the left on the drawing from the position indicated by the lines 13, the inner surface of the ring-shaped actuating means 23 slides with a low friction against the casing 20, which then squeezes together the end portion of the filter 4, such that the length of the filter is shortened in correspondence to the displacement of the actuating means 23. This arrangement means a careful treatment of the filter 4, which usually has a rough surface and sometimes is easily damaged. The casing 20 prevents more or less a direct contact between the filter and the actuating means.

The invention is of course not limited to the described and illustrated embodiments thereof but can be modified in different ways within the inventive concept as defined by the following claims. For instance, the operating of the actuating means 11 and 23 can be performed in different ways, for instance by chain or belt driving instead of the threaded rod 7. Further, the electric motor may be replaced by a pneumatic or hydraulic motor and the rod 7 by a gear rack. Self-explanatory, the filter may also be positioned in an exhaust air opening or in another place in an air treatment plant.

C L A I M S

1. An arrangement of ventilation plants comprising ducts in which bag filters or similar bag-shaped filters (4) made of filter gauze are mounted with the open end portions sealingly attached to the walls of the ducts (1), and balancing of the air flows in the ducts of the plant is achieved by required individual throttling of the air throughflow capacity of the filters (4) by adjustment of the effective length of the filters, **characterized** in that at least some of the filters (4) are provided with each a linear feeding device (6-10) positioned in parallel to the longitudinal direction of the filter and close to the outside of the filter, which feeding device is operating an attachment means (10) movable to and fro and supporting an actuating means (11,23) pushing axially against the closed end of the filter (4) to press together a required portion of the filter (4).

2. An arrangement according to claim 1, **characterized** in that the actuating means has the shape of a substantially tapered cap (11) having a diameter adapted to the diameter of the filter (4).

3. An arrangement according to claim 2, **characterized** in that the central portion of the cap is provided with a small aperture (12)

4. An arrangement according to claim 1, **characterized** in that the filter (4) is enclosed by a tubular air pervious casing (20) that is longer than the filter (4) and has end portions that are axially fixed, and the actuating means comprises a ring-shaped member (23) with an opening with a substantially smaller diameter than the diameter of the filter (4), through which opening the casing (20) extends and brings about the pressure of the ring-shaped member (23) against the outside of the filter (4) and the sliding along the outside of the filter, when the actuating means (23) is applied against the end portion of the filter and is moved along the extension of the filter.

5. An arrangement according to claim 4, **characterized** in that the casing comprises a large number of axially directed strings (20) or flexible ribbons.

6. An arrangement according to claim 4, **characterized** in that the casing (20) has the shape of a hose made of net material.

7. An arrangement according to any of claims 1-6, **characterized** in that the feeding device comprises a screw device having a rotatably journalled threaded rod (7) on which a threaded sleeve is movable supporting an attachment member (10) of the actuating means (11,23).

8. An arrangement according to any of claims 1-6, characterized in that the feeding device comprises a rack along which an attachment member (10) provided with a pinion is movable, to which attachment member the actuating means (11,23) is attached.

9. An arrangement according to any of claims 1-8, characterized in that the feeding device (6-9) is provided with an electric motor (6) for driving the attachment member (10).

10. An arrangement according to any of claims 1-8, characterized in that the feeding device (7,9) is provided with a pneumatic motor for driving the attachment member.

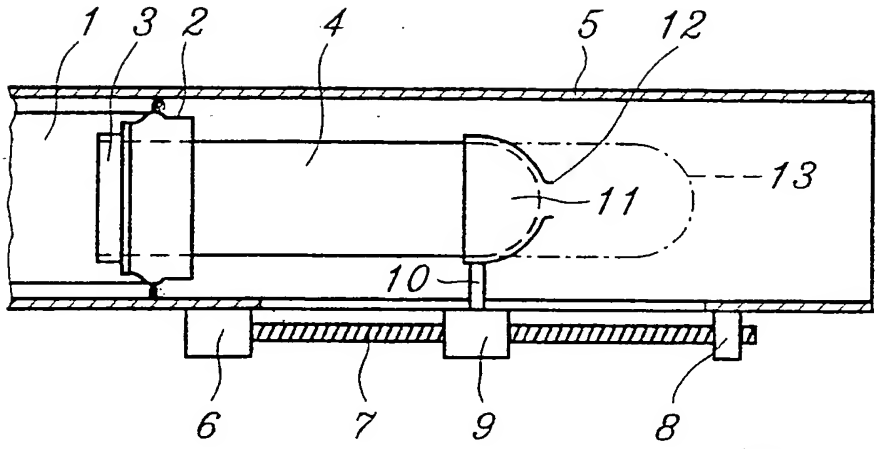

Fig. 1

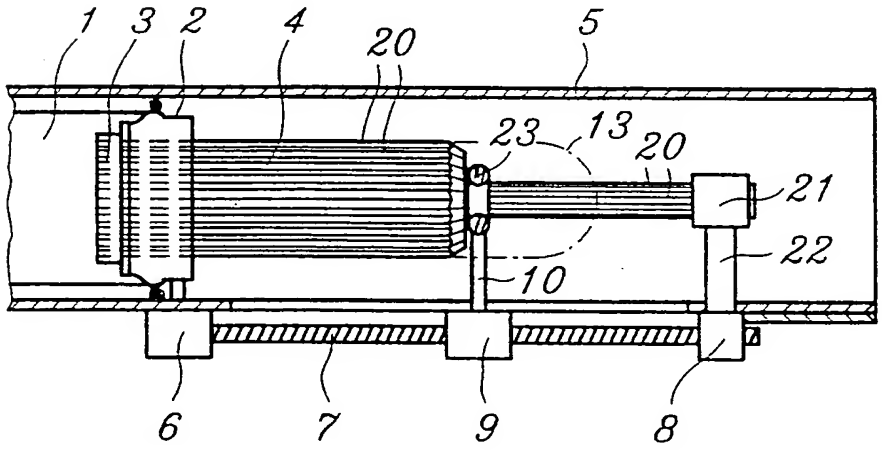

Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 98/01923

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B01D 46/44
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9720615 A1 (ANDERSSON, PER OTTO), 12 June 1997 (12.06.97), abstract -- --------	1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Information on patent family members

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International application No.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9720615 A1	12/06/97	AU 1045697 A	27/06/97
		SE 505549 C	15/09/97
		SE 9504324 A	02/06/97